

The result of bagged Pyrinuron baits for control rodent pest of forests

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Abstract Bagged and dispersed Pyrinuron (a self-formulated rodenticide) were tested for control of *Clethrionomus rutilus* and *Clethrionomus rufocanus* in larch plantation, Pingshan area, Heilongjiang Province from Oct. 1998 to Apr. 1999. The results showed that the bagged Pyrinuron has good result for control of the two rodent pests. The density of rodents was reduced by 90.5% after application of bagged Pyrinuron. This application method has characteristics of long residual period, bait not going mould and saving labour force.

Key words: Bagged rodenticide, Pyrinuron, Larch plantation; Rodent pest Control

Introduction

Clethrionomus rutilus and *C. rufocanus* were major forest rodent pests in Northeast China (Yang 1997). As the area of artificial forests has been increasingly enlarged, the occurrence of rodent pests also has an increasing tendency in Heilongjiang Province (Hou 1995). The plantations of *Larix gmelini* and *Pinus sylvestris* var. *mongolica* suffer from rodent pests more seriously, even affected forestry production. Pyrinuron, a kind of rodenticide which was formulated by authors' self, was used to control two rodent pests mentioned above in larch plantation in Pingshan area, Heilongjiang Province, from October of 1998 to April of 1999. Two application methods—bagged and dispersed were adopted.

Materials and Methods

Larix gmelini plantation of 5~8 years old was selected as a trail plot at Zhi'an village of Pingshan Town, Acheng city, Heilongjiang Province. The trail plot was on south slope with 12~30 degree. Soybean was cropped in the forest. The main rodent pests were *C. rutilus*, *C. rufocanus* and *Apodemus agrarius*.

Formulation of Pyrinuron: Fresh corn 50%, fish dust 10%, wheat bran 25%, melon seeds 15%. These materials were mixed with host crystal by 100:1.52.

The materials were mixed, broken to pieces, passed screen, then mixed with host crystal evenly,

pressed into cylinder and dried. Water content of the rodenticide was 8%, with 0.5~1.0 kg/cm² of compression strength. 10-g dried rodenticide was packed with a plastic bag and stored in dry and open position.

According to the habit of rodent pests, the destroyed symptoms of trees and density of rodent pests, a 10-g bagged Pyrinuron was discharged at 5-m interval distance, averaging 3 kg/hm². Control result was investigated ten day later.

Density of rodents was investigated before application of rodenticide. 100 rodent pincers were placed in each sample plot of 2 hm². The space of pincers was 5 m × 5 m. The results were shown in Table 1.

Table 1. The density of rodent pests in sample plot

Plot No.	Rodent species				Total
	<i>C. rutilus</i>	<i>C. rufocanus</i>	<i>A. agrarius</i>	other	
1	5	4	2	1	12
2	6	3	2	2	14
3	6	5	1	1	13
4	6	4	2	1	13

Results

Experiment indoors

The caught rodents were divided into 4 groups and 5 rodents for each group were raised in a cage. They were fed with non-host-crystal baits and enough water. After 3 days of normal feeding, 10 bags (10 g for each bag) of poisonous baits were put into the cages for each group. Two hours and 20 minutes later, *C. rutilus* and *C. rufocanus* began to bite the bags of poisonous baits. 14 h later, all of the 10 bags of baits were bitten, and 24 h later, all of the rodents died of poison. It was found that at the beginning of biting,

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the rodents did not eat the baits, but 4 h later, they began to eat the baits.

Field observation of poisoning

100 bags of baits were discharged in spacing of 5 m × 5 m. On the second day, the bait bags that were bitten were replaced with new ones (See Table 2).

Table 2. The baits eaten by rodent pests (1998)

Time	Number of Bait bags	Number of bitten bags	Bait amount eaten /g
Oct.10	100	2	3
Oct.11	100	3	2
Oct.12	100	15	6
Oct.13	100	14	7.2

Clethrionomus rutilus and *C. rufocanus* had a new response on bagged bait, but this response disappears in short time. The bagged baits had no effect on feeding action of rodent.

Application in a small area

The plastic bagged-baits and dispersed baits were discharged in 2 natural plots of 16.66 hm². The control plot was 200 m from the application plots. The application rate was 3 kg/hm². The results were shown in Table 3.

In the April of next year, 500 pincers were placed in bagged rodenticide application area, dispersed rodenticide area and control area respectively. The space of pincers was 5 m × 5 m (See Table 4).

Table 3. Investigation of results of rodenticide application in 1998

Discharging method	Application rate /kg hm ²	Controlled area /hm ²	Pincers placed after control	The number of captured rodents	Capture rate %	Control result %
plastic bagged baits	3	16.66	384	4	1.04	90.5
Dispersed baits	3	16.66	385	14	3.64	66.7
Contrast			300	42	14.00	

Table 4. Rodent density in controlled area in April 1999

Sample plot	Number of Pincers	Captured rodents	Capture rate (%)
Bagged rodenticide application area	500	2	0.4
Dispersed rodenticide application area	500	19	3.8
Contrast area	500	61	12.2

Conclusion and suggestions

Application of bagged Pyrinuron to control rodent pests had gotten good result. Plastic bag can prevent rodenticide from going mould and residual period can be prolonged. This application method can save labour force and is suitable to be used in forest conditions. It is suggested that plastic bagged Pyrinuron can be used in larger area.

The outbreak of rodent pests has a close relationship with the sanitation condition. Removing weeds and grading land preparation may destroy the living condition of rodent pests and prevent trees from being killed by rodents.

The habitat of the natural enemies of rodent pests should be protected. The natural enemies can be used to control rodent pests, which is an effective and prolonged method.

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